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The Law of Demand--The Roles of Gregory King and Charles Davenant

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THE LAW OF DEMAND — THE ROLES OF GREGORY KING AND CHARLES DAVENANT

G. Heberton Evans, Jr.

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I. A Sentence in King's Working-journal

The Law of Demand, which has always been referred to as King's Law of Demand, can be traced back to Gregory King's reaction to a reading of James Puckle's *England's Interest: or, A Brief Discourse of the Royal Fishery. In A Letter to a Friend.*[1] The Puckle pamphlet appeared in 1696 and must have been read by King shortly after its publication. King's observations on Puckle's work contain a specific — though very brief and heretofore unpublished — statement of a relation between the price of corn and its scarcity. Shortly thereafter Charles Davenant published a somewhat different and more elaborate, though possibly not an entirely independent, demand schedule. On the basis of the evidence that follows, it will, I believe, seem more appropriate to refer either to the King-Davenant or to the Davenant-King Law of Demand — or even to the Davenant Law of Demand.

King's observations on the quantity–price relationship are to be found in a manuscript volume that appears to be his working-journal. This document is today in the Members' Library of the London County Council. David V. Glass has used it in a population study, where in a footnote he states that the volume at one time belonged to Viscount Sydney and passed to the late John Burns, apparently in 1917; at the latter's death it was purchased from the Burns library by Lord Southwood and presented to the Council.[2]

1. Published in London in 1696 by J. Southby. The title page, from which the above was taken, contains the notation: The Second Edition. Puckle's name with the date of Sept. 30, 1696, appears at the end of the "letter." I have been unable to examine the first edition, but the *Dictionary of National Biography* (London and New York, 1896, XLVII, 1) gives the same title as above except for a plural for "Interest" and adds: "This [the pamphlet] appeared late in 1696, and reached a second edition in the same year."

2. I am indebted to the London County Council for a microfilm of this King manuscript volume and for permission to reprint it. The comment of Professor Glass is in his "Gregory King and the Population of England and Wales at the End of the Seventeenth Century," *The Eugenics Review*, XXXVII (Jan. 1946), 171.

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King's observations that are in point here stem from his reading of page 25 of the Puckle work cited above. They occupy page 234 of his working-journal and almost fill the page. Immediately preceding these observations in the working-journal are some notes on a pamphlet by E.L.; for this item, King's heading in his working-journal reads: "Extract of a two Sheet Pamphlet in 4°. Intitled, A Short Discourse about Our Keeping Our Money — by a Disc.nt upon France. By E.L. published circ. 8 Jan. 1695."[3] Those notes, which cite particular pages in E.L.'s work (actually published in 1696), occupy pages 231–33, inclusive. Immediately following the reactions to Puckle's work, King's page 235 is devoted to "Extract of Her Free State of Holand a° 1696. a Pamphlet of 2 Sheets and ½. In q°."[4] Since these three items that appear together in the working-journal were published in 1696 and since on a page or so thereafter — namely on page 240 of the working-journal — there is a draft of the preface and an outline for Part 5 of King's *Natural and Political Observations* that in final form bears the 1696 date, it is reasonable to assume that the observations on Puckle's work were made in 1696.[5]

Page 234 of King's working-journal is reproduced in full on accompanying pages. At the top of his page in the margin is the citation of Puckle's pamphlet, which has been mentioned above; this is followed in the body of the page by a reference to provocative statements that begin at the bottom of Puckle's page 25 and continue through the top of his page 26.[6] King's observations, intro-

3. The pamphlet here referred to is doubtless the sixteen page *A Short Discourse About our Keeping our Money: Shewing That our Money may be kept among Our selves, and yet our Confederates strongly Assisted, by a Descent upon France,* by E.L. (London: Printed by B. Motte, 1696). King first entered the publication year as 1696 and then changed it to 1695.

4. This pamplet is *The Free State of Noland* (London, 1696, Printed for *J. Whitlock* near *Stationers-Hall*). King wrote Noland above Holand, but did not scratch out the latter.

5. The "Preface," written at the top of p. 240, is only one short paragraph (in contrast to two in the final manuscript), but most of the draft appears in the final version. The title of his *Observations* (in almost its final form) follows the draft of the preface, and then King gave an outline for Part 5 of the *Observations.*

Gregory King's *Natural and Politicall Observations And Conclusions upon the State & Condition of England,* in manuscript and dated 1696, is in the British Museum (Harl. Mss. 1898). In printed form it appears in: George E. Barnett, *Two Tracts by Gregory King* (Baltimore: The Johns Hopkins Press, 1936), pp. 11–56; and George Chalmers, *An Estimate of the Comparative Strength of Great Britain* (London, 1804), Appendix, pp. 28–69. A photostatic copy of the manuscript is in the Hutzler Collection of the Johns Hopkins University Library.

6. King cited only p. 25 of the Puckle work, but in its second edition — which is the only one I have been able to find — one must also read part of p. 26 to understand King's note.

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duced by the "G.K. obs." that begins in the margin, occupy the remaining portion of the page. The most significant sentence for present purposes is to be found about two-thirds of the way down King's page. It reads: "So that in England if $\bar{y}$ produce be but a 4th pt of its ordinary produce, the price will be 4 times its ordinary price." Such a dearth in English production required costly imports and decreased consumption. In the remaining lines of the page, his calculations associate a one-fifth decrease in consumption with a tripling of price.

II. Some Previous Statements About King's Law

This brief statement of the relation between price and quantity is the only such King statement I have been able to find. George E. Barnett noted it when some years ago he examined King's working-journal in John Burns' library.[7] Joseph A. Schumpeter's *History of Economic Analysis* contains a footnote to the effect that King's law of demand for wheat is to be found in Sections VI and VII of the latter's *Natural and Politicall Observations and Conclusions upon the State & Condition of England*,[8] but an examination of the photostatic copy of King's manuscript that is in The Johns Hopkins University Library shows that Schumpeter's reference is not correct.[9] Moreover, Schumpeter's text gives a statement of the law that is not to be found in a King document but in a work by Davenant.[1] Other scholars have commented upon King's Law of Demand, but they have cited the work of Charles Davenant rather than a passage written by King. The Earl of Lauderdale, for example, in a discussion of the effects upon prices produced by changes in quantity quotes the Davenant passage reproduced below but added in a footnote: "Gregory King's Calculation, published by Davenant."[2] Alfred Marshall in 1890 also used the Davenant figures, without citing Davenant, and stated in a footnote: "This is the

7. See Barnett, *op. cit.*, pp. 6–7.

8. *Op. cit.*

9. Joseph Alois Schumpeter, *History of Economic Analysis* (Edited from manuscript by Elizabeth Boody Schumpeter) (New York: Oxford University Press, 1954), pp. 212–13.

King's manuscript that I here refer to as his working-journal contains piecemeal drafts of his *Natural and Political Observations* as it appears in manuscript in the British Museum. An examination of those drafts did not reveal any statement of the law of demand.

1. *An Essay upon the Probable Methods of making a People Gainers in the Ballance of Trade*, by the Author of *The Essay on Ways and Means* (London, 1699), p. 83. Charles Davenant was the author.

2. The Earl of Lauderdale, *An Inquiry into the Nature and Origins of Public Wealth, and into the Means and Causes of Its Increase* (Edinburgh, 1804), p. 51.

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p. 25. A Famine never happens in England but it enriches Holland for 7 years after, as Sr. Walt. Rawleigh observd in his time, that in a dearth of Corn the Dutch sold us in a year and half to ye value of 2 mill. Sterling.

GK Obs. So they sold us about 1.300.000th worth of Corn in a year.

Suppose this to be shortly after ye great plague ao. 1604. or 90 years ago.

The Kingdom had then about 800.000 people less then now, viz.t at that time about 4.600.000

Suppose ye Ordinary price of Corn at that time 3s. p Bushel for wheat and that it did rise to 12 shill. p Bushell.

That at that time ye ord. Expence of ye Kingdom was in Dyet about 16 millions, whereof in Bread corn about 3/4 millions; —

That by reason of ye High price and scarcity of it ye Consumption in Bread Corn was but little above half 3 quarters of what it would have been, or 2/3 mill. Sterl. at ye ord. price. x

That Corn being raisd 4 times its price ye Expence was 8/12 millions Sterling near treble or double ye ord. Expence

That ye Merch.t bought it of ye Dutch at about 10s. p Bushell and ye Retayler brought it to 12. shillings

That it cost the Dutch but 3s. And that their profit was 6s. p Bushell. besides 12d p bushel freight.

Then to sell us as much Corn as would cost 1'300.000th p ann. at 9s. p Bushell, they sold us 2'900.000 Bushels. which cost them 430'000th and they gaind by it 870.000th.

That ye Comon Consumption in Bread Corn and flour and meal was then about 20. millions of Bushels p ann.

That in such a dear year ye Expence was but 13½/10 mill. of Bushells, of which ye Dutch furnished 3. mill. of Bushels, other Countries p chance 2 mill. more In all 5 millions. And Our own Country out of ye Remaining Stock, and ye produce of that bad year 8½ millions of Bushels, whereof 5'00'0000 out of ye old Stock and 3½ mill. of Bushels out

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of ye new.

That ye Remaining Stock of old Corn at ye next harvest is not ordinarily above a 4th part of ye annual produce, or 5. millions of Bushels of Bread Corn.

That in such a year of dearth, ye produce was not above a 4th part of ye old. produce or 5 millions of Bushels, of which 1 million and ½ only remaind at ye next harvest for Stock and Seed-Corn.

So that in England if ye produce be but a 4th pt of its ordinary produce, the price will be 4 times its ordinary price.

That ye people cannot retrench in dear years above ye a 5th part of their usually quantity of Bread, nor above a 3d part of ye usually quantity of Wheat and Rye ~

But that ye Consumption instead of 20 millions of Bushels of Wheat and Rye will in such a dear year be 13 millions of Bushels of Wheat and Rye and 3 millions of Bushels of Oats Barley and Peas bread. in all 16 mill. of Bushells.

So that in 1694 when Corn did rise about dear 3 times its old. price, viz. ye half peck loaf at London from 5d to 20d.

The Consumption of Engd was about 24 mill. of Bushels of Wheat and Rye, at the time when ye half peck loaf was 5d. but upon ye rise to 20d & 21d.

The Consumption was about a 5th part less or 20 millions of Bushels in all. Whereof in Wheat and Rye about a 4th part less then 24 mill. viz 18 millions, and 2 millions of Bushels Extry in Oats, Peas and Barley for Bread Corn.

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famous estimate quoted by Gregory King."[3] In the second edition of Marshall's *Principles* the sentence just given is followed by: "Its bearing on the Law of Demand is admirably discussed by Lord Lauderdale (*Inquiry*, pp. 51–53)."[4] In 1915 G. Udny Yule published an article entitled: "Crop Production and Price: A Note on Gregory King's Law."[5] The "law" is stated, in the Yule article, "as printed by Davenant," and no citation to any writing of King is given. George J. Stigler has observed: "The first 'empirical' demand schedule was published in 1699 by Charles Davenant . . . [Here follows the title of the essay and two thirds of the passage set forth just below.] A century later these calculations were attributed to Gregory King by Lord Lauderdale, without any known basis; and since then they have usually been known as Gregory King's 'law'. Innumerable economists have since commented, generally favorably, upon the law."[6]

III. Davenant's Role

The so-called King's Law of Demand is never given in the form that is clearly King's — namely, that set forth above on page 234 of his working-journal — but the law always is taken from the following passage from Charles Davenant's *An Essay upon the Probable Methods of Making a People Gainers in the Ballance of Trade:*

We take it, That a Defect in the Harvest may raise the Price of Corn in the following Proportions.

Defect		*above the Common Rate.*
1 Tenth	Raises the price	3 Tenths
2 Tenths		8 Tenths
3 Tenths		1.6 Tenths
4 Tenths		2.8 Tenths
5 Tenths		4.5 Tenths

So that when Corn rises to treble the Common Rate, it may be presum'd, that we want [i.e., lack] above a third of the Common Produce; and if we should want [i.e., lack] 5 Tenths, or half the Common Produce, the Price would rise to near five times the Common Rate.[7]

3. Alfred Marshall, *Principles of Economics* (London and New York: Macmillan, 1890), p. 167 and note 1.
4. Alfred Marshall, *Principles of Economics*, (2d ed.; London and New York: Macmillan, 1891), p. 165, note 2.
5. *Journal of the Royal Statistical Society*, LXXVIII (Mar. 1915), 296 ff.
6. George J. Stigler, "The Early History of Empirical Studies of Consumer Behavior," *Journal of Political Economy*, LXII (Apr. 1954), 103–4. Three footnotes not needed here have been eliminated from the quotation.
7. From p. 83 of the 1699 London edition, "printed for *James Knapton*, at the *Crown* in St. *Paul's* Church-yard."

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As Yule has pointed out, the last three lines in the last column of Davenant's table must be read "1 and 6 tenths," "2 and 8 tenths," and "4 and 5 tenths." [8]

The question that now arises is this: Is the law of demand in this form — the usually quoted form — King's or Davenant's? My own feeling is that *in this form* it is Davenant's, though in all probability Davenant either saw King's formulation as set forth on page 234 of King's working-journal — or Davenant discussed with King that formulation. King and Davenant must have worked together rather closely. King used Davenant's data; [9] he also "gave" Davenant his material; [1] and Davenant in his writings drew liberally upon, and gave credit to, King's work.[2]

Davenant's chapter, in which the passage relating harvest deficiencies and the price of corn appears, begins with a discussion of the volume of agricultural products. Gregory King's data on agricultural production are the acknowledged source of the basic information — but Davenant has apparently reconstructed some of King's crop figures.[3] Davenant, for example, sets forth the following table on the produce of arable land:

THE PRODUCE OF THE ARABLE LAND, HE THUS ESTIMATES IN A YEAR OF MODERATE PLENTY [4]

Scheme F

	Bushels	per Bushel s. d.	Value.
Wheat	14,000,000	at 3 — 6	2,450,000
Rye	10,000,000	at 2 — 6	1,250,000
Barly	27,000,000	at 2 — 0	2,700,000
Oats	16,000,000	at 1 — 6	1,200,000
Pease	7,000,000	at 2 — 6	875,000
Beans	4,000,000	at 2 — 6	500,000
Vetches	1,000,000	at 2 — 0	100,000
In all	79,000,000	at $2 - 3\frac{45}{79}$	9,075,000

The *he* in the title of the table is Gregory King, but there seems to be some independence in these data, for they do not reproduce in

8. Yule, *op. cit.*, p. 296.

9. See, for example, pp. 11 and 12 of King's working-journal, where Davenant's data on houses and chimneys are used as the bases for computations.

1. *Ibid.*, p. 285, where in King's index to his working-journal he wrote: "Observations upon ȳ People of England in a kind of Treatise as given to Dr Davt 221." See also *ibid.*, p. 221.

2. See, for example, Section II (pp. 15 ff.) of Davenant, *op. cit.*

3. In the light of what follows, *reconstructed* seems to me to be the appropriate term here. Davenant has been dealt with less kindly by others in such matters; Chalmers (*op. cit.*, Appendix, p. 22), for example, claims that Davenant was allowed "to garble" King's material. I prefer to regard Davenant as revising King's data — data that King probably did not feel too certain about — in accordance with Davenant's own information or hunches.

4. Davenant, *op. cit.*, p. 71.

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their entirety any King table that I have seen. In the first place, no such King table has in its title "in a year of moderate plenty," but this does not seem to be an unwarranted stretch of King material; it is very reasonable to assume that King had in mind such a period. More serious deviations occur in some of the figures. In King's *Natural and Political Observations* as it appears in the final manuscript now in the British Museum, the figures on the production of wheat, rye, and barley are different; they are, respectively, 12 million bushels, 8 million bushels, and 25 million bushels.[5] But I doubt that King felt very certain of his data, and I suspect that Davenant knew of this uncertainty and revised the data according to some ideas of his own. In King's working-journal on page 201 there is a similar table giving production figures, in millions of bushels, for wheat, rye, barley, oats, peas, beans, and vetches of 8, 10, 22 or 20, 16, 10, 5, and 1, respectively. Adjacent in the margin of that page, these figures are — preserving the same order — revised to 12, 8, 24 or 25, 16, 8 or 7, 4, and 1.[6] The figures in the margin for wheat, rye, and barley are almost identical with the production figures in the final draft of the *Natural and Political Observations*. In view of King's variations in the production figures for some products and the differences in the figures from one of his drafts to the other,[7] it seems likely that King was not entirely satisfied with his estimates. Davenant accepted: King's figure on oats;[8] King's total for oats, peas, beans, and vetches;[9] and King's highest figure on rye.[1] Davenant increased still further King's upward revisions of the wheat and barley production estimates.[2]

Having reconstructed King's data on the products of arable land, Davenant adds what I believe is his own table relating deficiencies in the harvest and increases in the price of corn. Then, in the light of both the modified normal production figures of King

5. See p. 36 of Barnett, *op. cit.* The other production figures and all prices are the same in the two tables.

6. The main body of p. 201 was probably written in 1696 between Jan. 2 and Jan. 20; compare the dates on pp. 197 and 205. Such precise dating for the marginal notes is not possible, but no part of this working-journal seems to have been written after 1696.

7. It should also be noted that on p. 259 of his working-journal King gives the following production figures: wheat and rye, 18 million bushels; barley, 24 million bushels; and oats, peas, beans and vetches, 28 million bushels.

8. King's working-journal, p. 201.

9. *Ibid.*, p. 259.

1. *Ibid.*, p. 201.

2. King's maximum figure for wheat was 12 million bushels (margin of p. 201 of working-journal, and the *Natural and Political Observations*, p. 17 of the original mss. or p. 36 of Barnett, *op. cit.*); his maximum for barley was 25 million bushels (same references).

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and his own scheme of price changes associated with crop failures, Davenant points out the high national cost of a poor harvest year, particularly if the grain must be imported to make up for the deficiency. This leads him to argue strongly for the establishment of storage facilities to even the flow of grain into the market and to lessen the possibility of an unfavorable balance of trade due to a poor harvest.[3]

Davenant closes this portion of his discourse with the following: "We have look'd into Mr. *King's* Computation of the Corn, because it should be the Fundamental Care of a good Government, to provide that the People never want [i.e., lack] it, for two or three Years defect there pulls down whatever the Merchant has been doing for a long time."[4] This passage and the extensive use of King's data by Davenant perhaps explain why some have attributed to King the Davenant table relating harvest deficiencies and price rises. It seems to me that it is more reasonable to regard King's data on agricultural production and perhaps King's statement on harvest deficiencies and prices to be found in his working-journal as the stimuli for Davenant's own production statistics and his more extensive table on price-quantity relationships.

IV. Early Variations of the Demand Schedule

It may be interesting to some readers to add a note concerning two early extensions of that Davenant table. Without reference to Davenant's writings, Letter No. 200 of *The Spectator*, dated October 19 (1711), contains the statement that, if the annual production of perishable things (and all agricultural products are so regarded) were increased even by one-tenth "beyond all possibility of use," their value would be decreased by one-half.[5] Thus an *increase* of 10 per cent in quantity would produce a 6/11's *fall* in price. John Dalrymple pointed out in 1764 that merchants observed that, if the quantity of an article fell from its average amount by one-third, its total value would nearly double, while, if instead the average quantity increased by one-third, the total value would fall to nearly one-half.[6] Thus a one-third decrease in quantity would

3. Davenant, *op. cit.*, p. 84, points out that Sir Walter Raleigh in his *Remains* "reckons the *Dutch* to get an Immense Sum by this sort of Trade." Puckle in the pamphlet cited at the beginning of this article and King on p. 234 of his working-journal also refer to Raleigh's comment.

4. *Ibid.*, p. 88.

5. *The Spectator*, Vol. III (London, 1767), No. 200, p. 126.

6. John Dalrymple, *Considerations of the Policy of Entails in Great Britain; Occasioned by a Scheme to apply for a Statute to let the Entails of*

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approximately treble price, and a one-third increase in quantity would reduce price to approximately 3/8's of the average price. In a way these authors may be thought of as developers of Davenant's statement, for *The Spectator* item deals with an increase (rather than decrease) in the quantity and the Dalrymple observation deals with both an increase and a decrease in the average quantity.

V. Conclusion

Davenant's role in the formulation of the Law of Demand, I feel, has been much undervalued. In view of the fact that the widely utilized Davenant statement of the law is almost certainly not a reproduction of any written statement by King (the only similar statement by King apparently being the brief one in his working-journal) and in view of the fact that King's particular version was long buried in his working-journal unless it came to light in a much modified form through Davenant in consequence of his having seen the statement in the working-journal or of his having discussed it with King prior to the writing of his *Essay on Probable Methods*, it seems appropriate henceforth to refer to the "King-Davenant Law of Demand" — or even the "Davenant-King Law of Demand." Perhaps on the basis of the above evidence some will want to go so far as to write of "Davenant's Law of Demand" and to let King's fame rest upon contributions that are more clearly his.

The Johns Hopkins University

Scotland die out, on the demise of the Possessors and Heirs now existing (Edinburgh: printed for A. Kincaid & J. Bell, 1764).

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